

Building Partnerships for Sustainable Education

Environmental Protection Agency
Science Forum
June 3, 2004

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Education for Sustainability

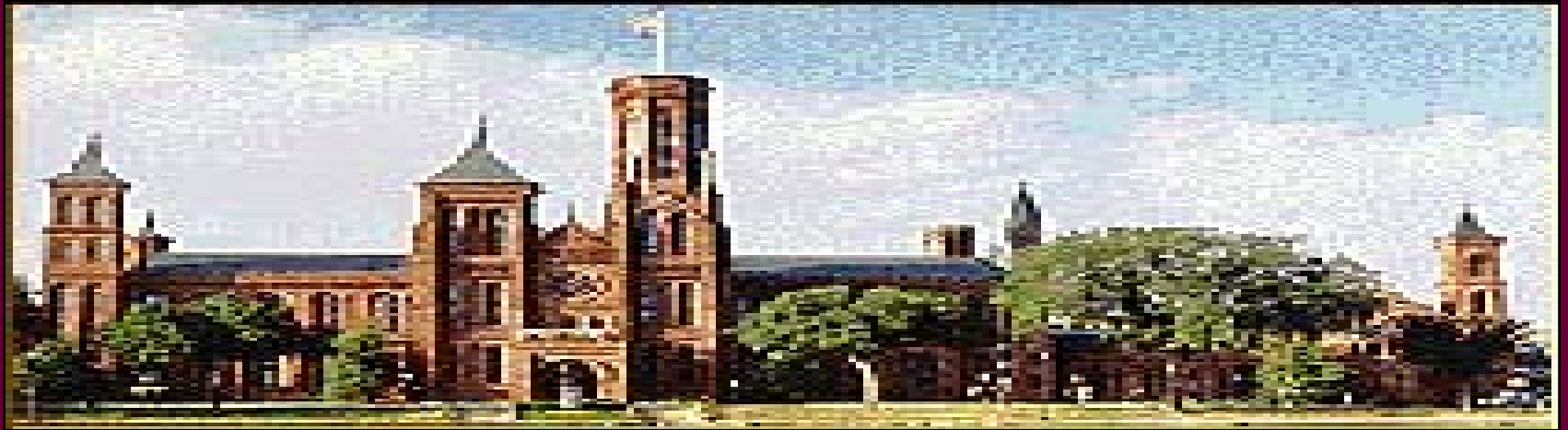
Education for sustainability is a lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, and commitment to engage in responsible individual and cooperative actions. These actions will help ensure an environmentally sound and economically prosperous future.

Building Partnerships for Sustainable Education

Outline of Remarks

- What is the National Science Resources Center?
- What is the state of science education in U.S. schools?
- What is the vision for science education based on research and best practice and **how does this relate to sustainable education?**
- **Based on these experiences, what recommendations would we make for building partnerships that would lead to sustainable education?**

National Science Resources Center



**Established in 1985 as an organization
of the National Academies and the
Smithsonian Institution**

National Science Resources Center

Mission

To improve the learning and teaching of science in the nation's 16,000 school districts

Vision

All students having access to research-based science programs that will lead to improved attitudes about science, an increase in student achievement, and lifelong learning skills.

Strategy

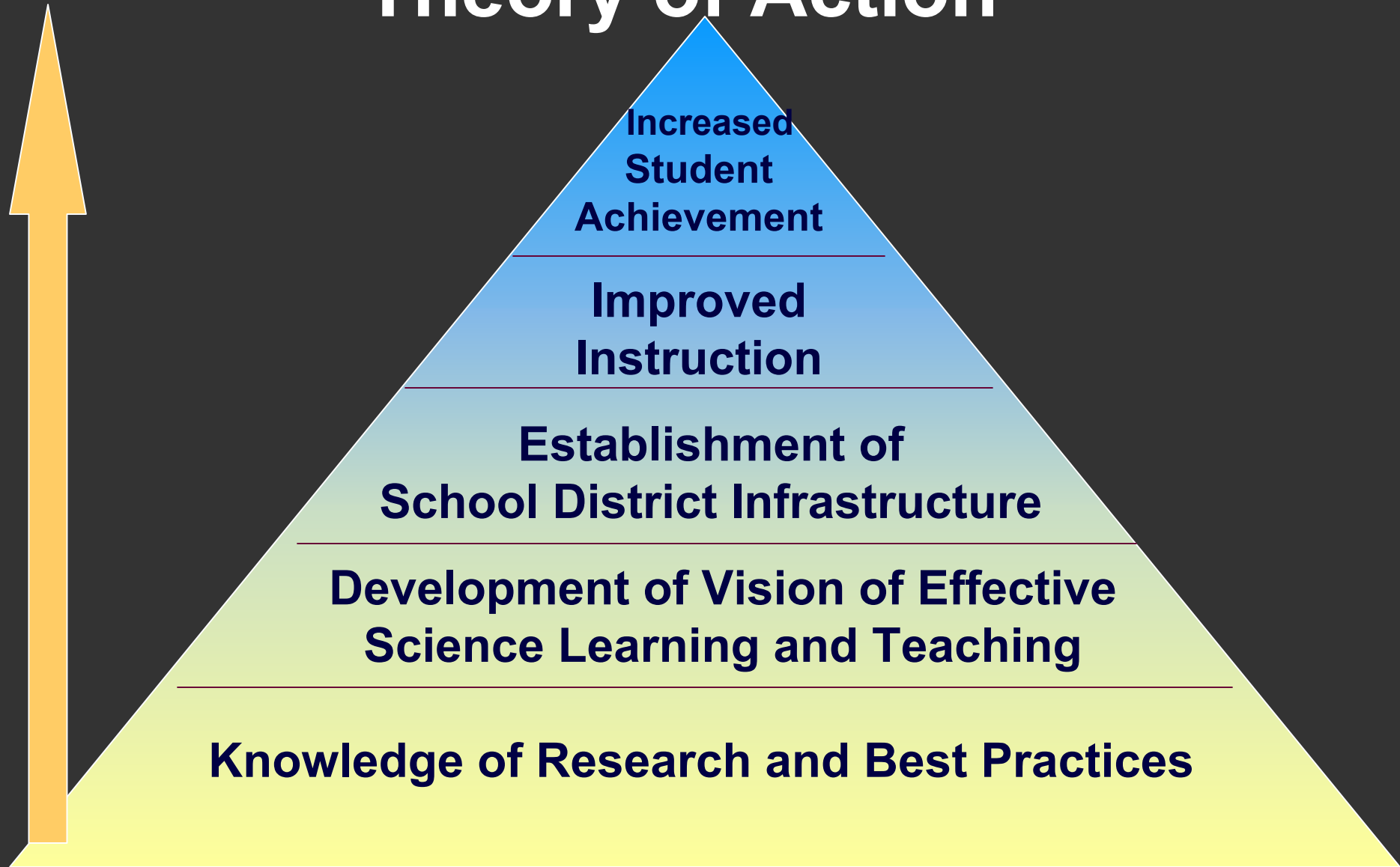
To assist school districts nationwide in implementing research-based science programs for K-12 students.

National Science Resources Center

Core Principles

- 1. Science for all children**
- 2. Products and services are informed by research and incorporate best practices**
- 3. Reform strategies focus on systems thinking and leverage change through strategic partnerships**

NSRC Science Education Reform Theory of Action



Stages of Work

Increasing Time, Resources, Complexity



Initiation Phase



Implementation Phase



Institutionalization Phase

NSRC Centers of Excellence

**Curriculum
Development
Center**

**Leadership and
Assistance for
Science Education
Reform Center**

**Professional
Development
Center**

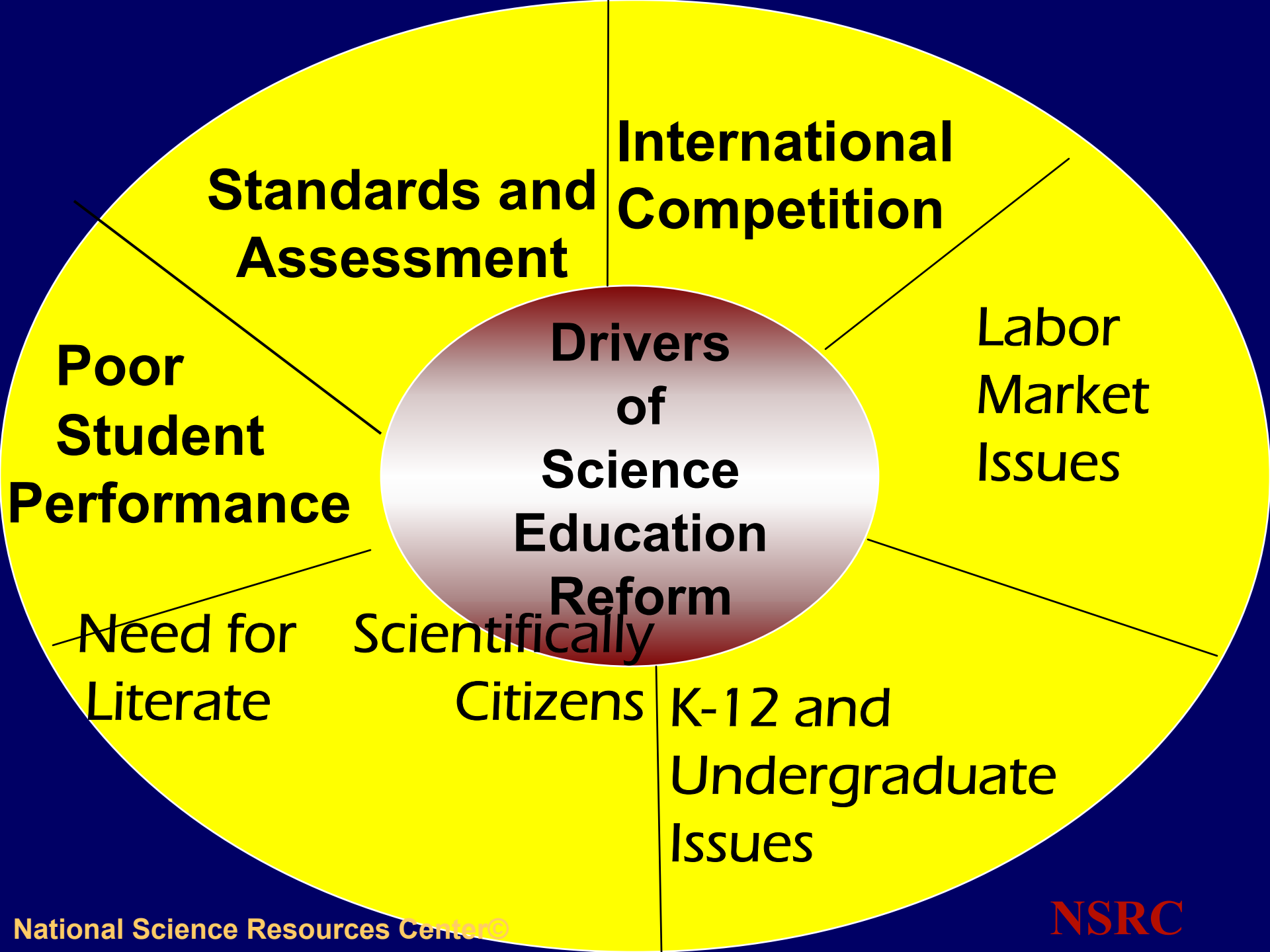
Building Partnerships for Sustainable Education

- *What is the state of science education in U.S. schools?*

Historical Context

Nature of Schools

Drivers of Reform



National Commission on Excellence in Education

- **“Our once unchallenged preeminence in commerce, industry, science, and technological innovation is being overtaken by competitors throughout the world.” 1983**
- **Report called special attention to how far American students lagged behind the rest of the developed world in science and mathematics education**

U.S. Talent Pool of Scientists and Engineers

Insufficient and Declining

International Comparisons of U.S. Performance in K-12 Science Education

Last in the world

Scientific Literacy

Citizens and Students

**Majority have little to no
understanding of the
nature of science
and**

**No direct experiences with effective
science learning and teaching**

Inadequate Workforce

Skills needed to be successful competitors in the modern world economy

- 1. A high capacity for abstract, conceptual thinking.**
- 2. The ability to apply that capacity for abstract thought to complex real-world problems—including problems that involve the use of scientific and technical knowledge—that are nonstandard, full of ambiguities, and have more than one right answer.**
- 3. The capacity to function effectively in an environment in which communication skills are vital – in work groups.**

*Ray Marshall and Marc Tucker,
Thinking for a Living*

Value of Science in the School Curriculum

**Not seen as
important as
reading and
mathematics**

Sources

**National Science Foundation
Education Trust
Public Agenda
Committee on Economic
Development**

Building Partnerships for Sustainable Education

- What is the vision for science education based on research and best practices and how does this relate to sustainable education?

New Vision

- **All students should have the opportunity to learn science.**
- **Students should learn science in ways that reflect the modes of inquiry that scientists use to understand the natural world.**
- **The quantity of factual science knowledge needs to be reduced so that students can develop a deeper understanding of science.**

Learning for the Future (CED 2000)

Three Challenges for Science Education:

- **Increasing Student Interest in Science to Maintain the Pipeline**
- **Demonstrating the Wonder of Discovery While Mastering Rigorous Content**
- **Acknowledging the Professionalism of Teachers**

National Efforts

American Association for the Advancement of Science **Project 2061**

Benchmarks for Science Literacy

- **“Students will end up with richer insights and deeper understandings than they could hope to gain from a superficial exposure to more topics than they can assimilate.”**
- **“The problem for curriculum developers, therefore, is much less what to add than what to eliminate.”**

Establishment of National Science Resources Center 1985

U.S. National Academy of Sciences

National Science Education Standards

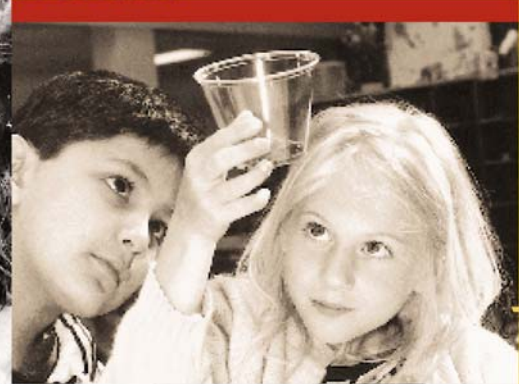
Published 1996
18,000 reviewers
250 pages

NATIONAL
SCIENCE
EDUCATION
STANDARDS

understand



wonder



assess



interact



encourage

explore

National Science Education Standards

- **Guiding Principles**
 - Science is for all students
 - Learning science requires active engagement
 - School science should reflect professional science
 - Improving science requires system-wide reform
- **The Standards**
 - Content
 - Teaching
 - Professional Development
 - Assessment
 - Program and System

State and Local Efforts

Value of Science

- Need for science to have the same status in the curriculum as reading and mathematics

State Standards

- Need for state science standards to reflect a vision that is developmentally appropriate and with a philosophy that less is more for K-12 students

Programs Based on Research and Best Practices

- Need for school districts having strategic plans focused on a systemic approach to improving their science programs that are based on research and best practices

Research-Based Curriculum

- Need for a critical mass of teachers, administrators, parents, and community leaders valuing research-based curriculum
- Need for sufficient research-based K-12 curriculum / instructional materials

Preparation of Teachers

- Need for current and new teachers having adequate academic backgrounds and preparation to teach science effectively



Preparation of Teachers

- Need for sufficient and ongoing in-service education for K-12 teachers of science



Equipment and Supplies

- Need for hands-on science equipment and materials for K-12 teachers of science to use



Appropriate Assessment

- Need for appropriate tests used to assess inquiry-centered science learning



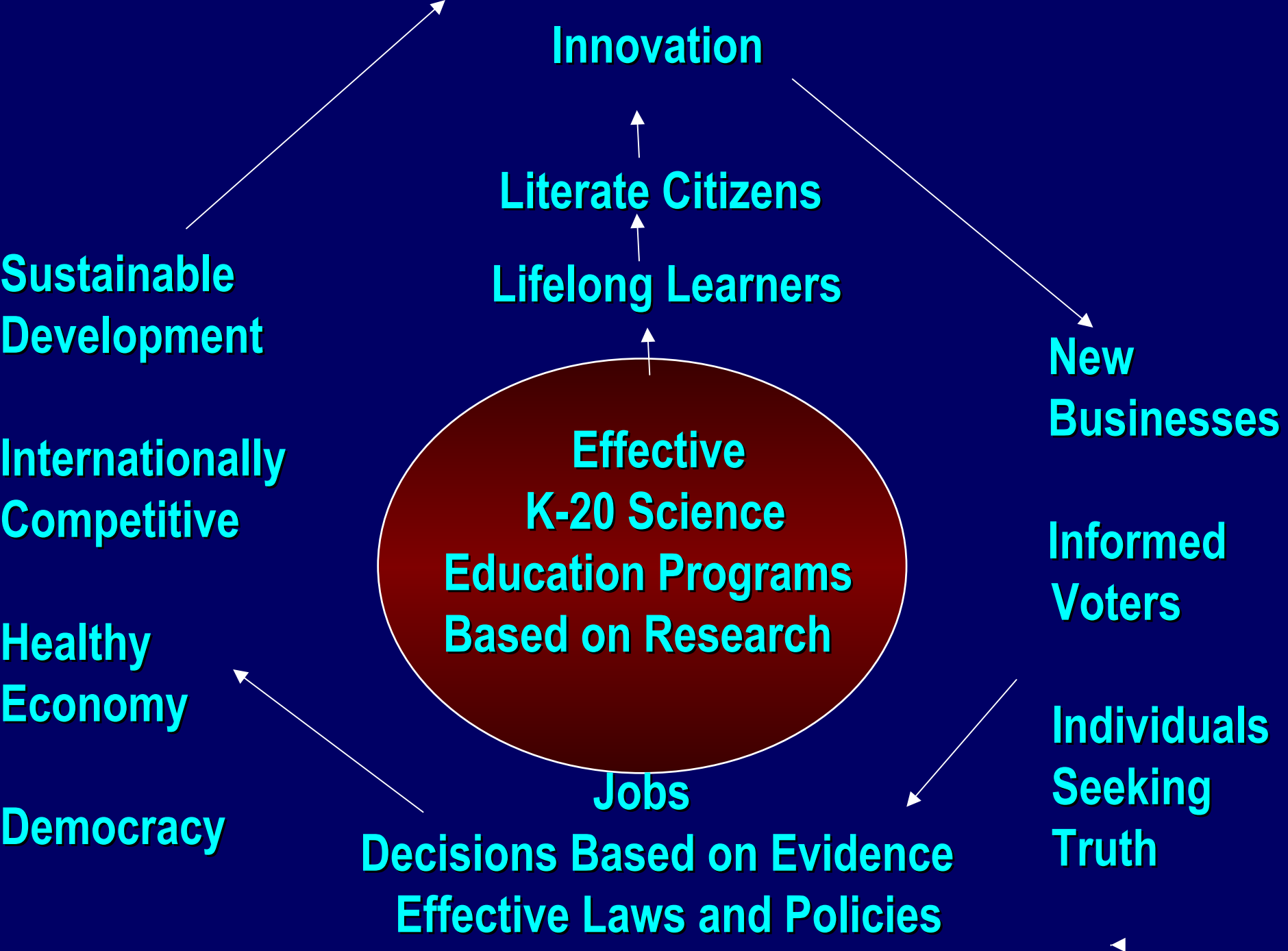
Supporting Context

- Need for administrators, community leaders, parents, and state officials to provide an environment and establish policies that align with programs based on research and best practices.

Supporting Context

- Need for active engagement of the scientific and engineering community in all aspects of reform





Building Partnerships for Sustainable Education

- **Based on these experiences, what recommendations would we make for building partnerships that would lead to sustainable education?**

**To Build the Talent We Need
for Sustainable Education,
We Need To Form
Partnerships with
Individuals and
Organizations Who Will**

**Be bold and dedicated leaders
from our scientific community
who will not only talk and
analyze the problem but
accept responsibility for
achieving results**

Advocate Need for Systemic Change and Raised Expectations In

Government and Legislature

Education Management and Administration

Private Sector Networks

General Public Domain

Assist with Change Management and Resource Allocation

Validate Focus on Science Education

**Take our best
practices to scale**

Thank you

National Science Resources Center

www.nsrconline.org